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October 30, 2012 Project No. 12-01-201-201

Clark County
Department of Air Quality
Air Pollution Control Officer
4701 W. Russell Road, Suite 200
Las Vegas, NV 89118

RE: Nevada Environmental Response Trust – Perchlorate Removal System
Initial AQR 12.1 Minor Source Permit Application

On behalf of the Nevada Environmental Response Trust (the Trust), Broadbent & Associates, Inc. (Broadbent) is pleased to present the attached Initial Air Quality Regulations (AQR) Section 12.1 minor source permit application. This application has been prepared in response to the Section 4 Information Request issued by Clark County Air Quality (Air Quality) to Veolia Water North America (Veolia) on September 12, 2012. Through the resolution of the Tronox LLC bankruptcy, the Trust took title to the former Tronox Site located within the Black Mountain Industrial (BMI) complex in Henderson, Nevada (Site). The Trust is primarily tasked with remediating and managing the Site. The Trust's beneficiaries are the State of Nevada and the United States of America.

Prior to the Trust's ownership of the Site, Tronox installed and operated a groundwater treatment system (GWTS) to remove perchlorate and chromium from the groundwater. When the Trust took title to the Site, the Trust, through its contractor Veolia Water North America Operating Services, Inc. (Veolia), continued to operate the GWTS. In the information request, the Control Officer states that Veolia may submit an air quality minor source permit application in lieu of a response to the information request if it is determined that the facility meets the requirements for an air permit. Based on an evaluation of facility emissions, uncontrolled emissions exceed the permitting threshold for hydrogen sulfide.

It should be noted that the facility does not trigger significance for hydrogen sulfide or any other regulated air pollutant (Table 1). As such, a Reasonably Available Control Technology (RACT) analysis is not included as part of this application package.

Table 1: Facility-Wide Potential to Emit

Pollutant	PM_{10}	NO_X	CO	SO_2	VOC	Lead	H_2S
Potential to Emit (tons/year)	0.00	0.00	0.00	0.00	0.25	0.00	3.78
Section 12.1 Permitting Threshold (tons/year)	5	5	25	25	5	0.3	1
Significance Threshold (tons/year)	7.5	20	35	40	20	0.6	5

Should you have any questions regarding this submittal, please do not hesitate to contact me at (702) 563-0600 or scole@broadbentinc.com.

Sincerely,
Broadbent & Associates, Inc

SCole

Sarah Cole, PE
Senior Scientist

Attachments A: Initial AQR 12.1 Minor Source Permit Application

CC: Andrew W. Steinberg, Vice President – Operations, Le Petomane, Inc. 35 East Wacker Drive Suite 1550, Chicago, IL 60601

Allan J. DeLorme, PE, Managing Principal, ENVIRON International Corporation, 220 Powell Street Suite 700, Emeryville, CA 94608

Tanya C. O'Neill, Foley & Lander LLP, 777 East Wisconsin Avenue, Milwaukee, WI 53202

Steve Kubacki, Project Manager, Veolia Water North America, 510 South Fourth Street, Henderson, NV 89015

ATTACHMENT A: MINOR REVISION APPLICATION

Protecting the air we share

Air Quality

CLARK COUNTY • DEPARTMENT OF AIR QUALITY

4701 W. Russell Rd., Suite 200 • 2nd Floor • Las Vegas, NV 89118-2231
(702) 455-5942 • Fax (702) 383-9994

For DAQ Use Only
Invoice Number:

Minor Source Permit Application

(Use this application to obtain a permit or exemption)

Section A: Application Type (select one)

☑ New Permit ☐ Renew Permit ☐ Significant Permit Revision ☐ Minor Permit Revision
☐ Initial AQR 12.1 Permit (Existing minor stationary source applying for first AQR 12.1 Minor Source Permit)

Section B: Source Information – MUST BE AS LISTED ON CITY/COUNTY BUSINESS LICENSE

Source ID: (enter Source ID listed in existing permit; otherwise, enter "New") New

Source Name: NERT Groundwater Extraction and Treatment System

Source Ownership: OTHER Source Operator: BUSINESS

City / County Business License Information: Number n/a Issued by

Physical Address Information (Not Applicable To Portable Sources)

Number:	Directional:	Street Name:	Street Type:	Suite:
510	SOUTH	Fourth	Street	

City: Henderson State: NV Zip: 89015

Mailing Address Information

Number:	Directional:	Street Name:	Street Type:	Suite:
35	EAST	Wacker	Drive	

PO Box: City: Chicago State: IL Zip: 60601

Phone Number: Fax Number:

North American Industry Classification System (NAICS)

Primary NAICS: 562910 Additional NAICS codes: (Optional)

Is the source located within 1,000 feet of the outer boundary of a school, hospital or residential area? ☐ Yes ☑ No

Section C: Company Information – MUST BE AS LISTED ON THE SECRETARY OF STATES BUSINESS CERTIFICATE / FILLING

Company Name: Veolia Water North America - West, LLC

Nevada Secretary of State Business ID: NV20051249590

Mailing Address Information

Number:	Directional:	Street Name:	Street Type:	Suite:
510	SOUTH	Fourth	Street	

PO Box: City: Henderson State: NV Zip: 89015

Phone Numbers:

Phone Number: (702) 566-6001 Fax Number:

Section D: Responsible Official (RO) Information

RO Name: Jay Steinberg, not individually but solely as President of the NERT Trustee RO Title: Solely as President, not individually

Number:	Directional:	Street Name:	Street Type:	Suite:
35	EAST	Wacker	Drive	

PO Box: City: Chicago State: IL Zip: 60601

Phone Numbers & Email Information:

Office: (312) 436-2801 Ext. City: Cell:

RO Email: andrew.steinberg@lepetomaneinc.com Method of Communication: US Mail

Section E: Plant Manager/Environmental Representative Information (Optional)

Name: Steve Kubacki

Title: Project Manager

Number:	Directional:	Street Name:	Street Type:	Suite:
510	SOUTH	Fourth	Street	

PO Box: City: Henderson State: NV Zip: 89015

Phone Numbers & Email Information:

Office: (702) 566-6001 Ext. Fax: Cell: (435) 841-1005

Email: steve.kubacki@veoliawaterna.com

Section F: Application Summary

Source Description: (Please describe the nature of your business, including processes and products.)

Veolia operates an environmental remedial process for biological reduction of perchlorate in extracted / collected groundwater.

Application Description: (please describe what is being proposed (e.g., adding, removing or changing equipment; changing permit conditions; requesting a voluntary emission limit, etc.)

This is an Initial AQR 12.1 permit application for the groundwater treatment plant and associated ethanol storage tank.

Section G: Application Supplemental Documents

1. **Mandatory Supplemental Documents – Required by AQR Section 12.1:**

Required	Attached	Supplemental Document
☒	☒	**Site Map.** A map that depicts the physical location of the stationary source, which must identify the source main entrance, source property boundaries, legal description, each Township, Range and Section (TRS) that is associated with source, and identifies all buildings and structures on the site as they relate to the source emission units.
☒	☒	**Flow Diagram.** A complete detailed flow diagram of each process that depicts all associated emission units.
☒	☒	**Source Potential to Emit (PTE) List.** For a new minor source, the list shall contain the source-wide PTE for each regulated air pollutant. For an existing source with a significant permit revision, the list shall contain the source-wide PTE for each regulated air pollutant before and after the permit revision as well as the Net Emissions Increase (NEI) associated with the permit revision. This list shall contain a description for any change to the PTE for an existing source.
☒	☒	**Emission Units List.** A complete list of each emission unit by process, which shall include the emission unit manufacturer, model, rating, serial number, and Source Classification Code (SCC). This list shall include the PTE for each regulated air pollutant emitted from each emission unit.
☒	☒	**Production Information List.** A list of fuels, fuel use, raw materials, material usage rates, production rates, and operating schedules to the extent it is needed to determine or regulate emissions.
☒	☒	**Inherent Limitations List**. Any inherent limitations, not to include self-imposed limits, on source operation affecting emissions or on any work practice standards affecting emissions.
☐	☐	**Actual Emissions Worksheet**. For an existing minor source that requires a significant permit revision, the application shall include a description and quantification all regulated air pollutants before and after the modification.

☒	☒	**Air Pollution Control Equipment (APCE) List**. Identification and description of air pollution control equipment, which shall include design specifications, model numbers and serial numbers. For each APCE listed, the associated emission units and processes shall be identified.
☐	☐	**RACT Demonstration Proposal**. For a new minor source that will have a PTE that is significant for any regulated air pollutant or for an existing minor source that requires a significant permit revision, a demonstration of Reasonably Available Control Technology (RACT) for the affected pollutant shall be proposed. The RACT Demonstration Proposal shall include the methodology by which RACT was determined, how compliance with RACT will be demonstrated (including material usage limits, performance testing, or continuous emissions monitoring, if applicable).
☐	☐	**Air Pollution Monitoring List**. Identification and description of air pollution compliance monitoring devices or activities, which shall include design specifications, model numbers and serial numbers.
☐	☐	**Schedule of Compliance**. For an existing minor source that requires a significant permit revision, the application shall include a schedule of compliance, if applicable.
☐	☐	**Minor Permit Revision Specification.** For a minor permit revision, the applicant shall specify all minor revisions to the permit in accordance with Section 12.1.6(b).
☐	☐	**Applicable Requirement (AR) Supplement.** In accordance with the AR, the applicant shall submit other required information that is not otherwise specified in this application. This supplemental information shall be uniquely titled for identification and review purposes. List AR Supplement document title below (which is an attachment to the application): **NOTE: If additional documents are submitted that are not specifically identified in this application, please reference the documents as an attachment to the AR Supplement and submit the documents as an attachment to the AR Supplement.**
2. Calculations Worksheets – Required by Control Officer. Worksheet containing calculations for supplemental documents submitted pursuant to this application**:**		
☒	☒	**Source-wide PTE and NEI Calculation Worksheet.**
☒	☒	**Emission Unit PTE Calculation Worksheet.**
☐	☐	**Actual Emissions Calculation Worksheet.**
3. Mandatory Supplemental Documents – Required by Control Officer:		
Required	**Attached**	**Supplemental Document**
☑	☑	**Stack Information List**. Stack location, height above grade, diameter (I.D. or effective), exhaust gasses, flow rate [ACFM], and temperature (if applicable).
☑	☑	**Federal Performance Standards List**. A list of federal performance standards, emission limits, and requirements that is applicable to the source (e.g. NSPS, NESHAPS, and MACT).

4. Optional Supplemental Documents:	
Attached	**Supplemental Document**
☐	**Voluntary Emission Limit Request**. If the application contains voluntarily accepted emissions limitation, the applicant shall demonstrate that the emission limitation to be imposed to avoid an applicable requirement is more stringent than any emission limitation that would otherwise be applicable to that source, including but not limited to those in the Nevada SIP. This request shall include all associated calculations for quantification of the limitation.
☐	**Voluntary Federal Enforceability Declaration**. A voluntary declaration submitted by the application, that declares the entire permit to be federally enforceable or specifically identified permit conditions or applicable requirements to be federally enforceable. This declaration applies to the permit, permit conditions and applicable requirements that are not federally enforceable in absence of the declaration.
☐	**Construction Schedule**. For a new or modified source, a schedule of construction.
☐	**Exempt Emission Units List**. A list of emission units or activities claimed as exempt under 12.1.2(c).
☐	**AR Exemption List**. A list of requested exemptions from otherwise applicable ARs, which shall include detailed justification for each requested exemption.
☐	**AR Exemptions List**. A list of requested exemptions from otherwise applicable ARs, which shall include detailed justification for each requested exemption.

Section H: Application Advisories

1. **Small Business Assistance Program (SBAP)**. If you are a small business (100 employees or less), you can receive assistance on permitting and compliance matters from the Department of Air Quality (DAQ) through SBAP. For assistance or to schedule an appointment please contact SBAP at (702)455-3455 (for permitting assistance) or (702)455-1624 (for compliance assistance).

2. **Fees and Payments:**
   Air Quality Program Fees: Section 18 (Permit and Technical Service Fees) of the AQR are available on the DAQ web site. Fees that are applicable to this application and the resulting permit are contained in these rules.

   Application Fee: The invoice for the application fee must be paid in full before the application will be processed.

   Permit Issuance: All invoices for the source and associated with the parent company of the source must be paid in full; otherwise, the source cannot be issued any permits, which includes the invoice for the permit fees that result from this permit application.

   Payment: Invoice payments must be made by check, money order, cash or credit card. Credit card payment must be made in person at the DAQ Main Office.

3. **Permitting Forms and Worksheets.** Forms and worksheets associated with stationary source permits are available under the 'Forms & Applications' > 'Source Permitting' link of the DAQ web site.

4. The Responsible Official must meet the requirements set forth in Section 12.4.2.1 (g) of the Air Quality Regulations.

Section I: Authority Granted

I authorize DAQ to transmit all communications, permits and billing invoices by the "Method of Communication" selected in Section D of this application. I acknowledge that by selecting E-Mail, all listed items will be transmitted electronically. I further acknowledge that by selecting US Mail, additional postage fees may be incurred.

Section J: Truth and Accuracy Certification

As the Responsible Official, based upon information and belief formed after reasonable inquiry, I certify that the statements and information in this application and the attached supplemental document and worksheets are true, accurate, and complete. My signature acknowledges that I am liable under Nevada Revised Statutes (NRS) that forbid false or misleading statements.

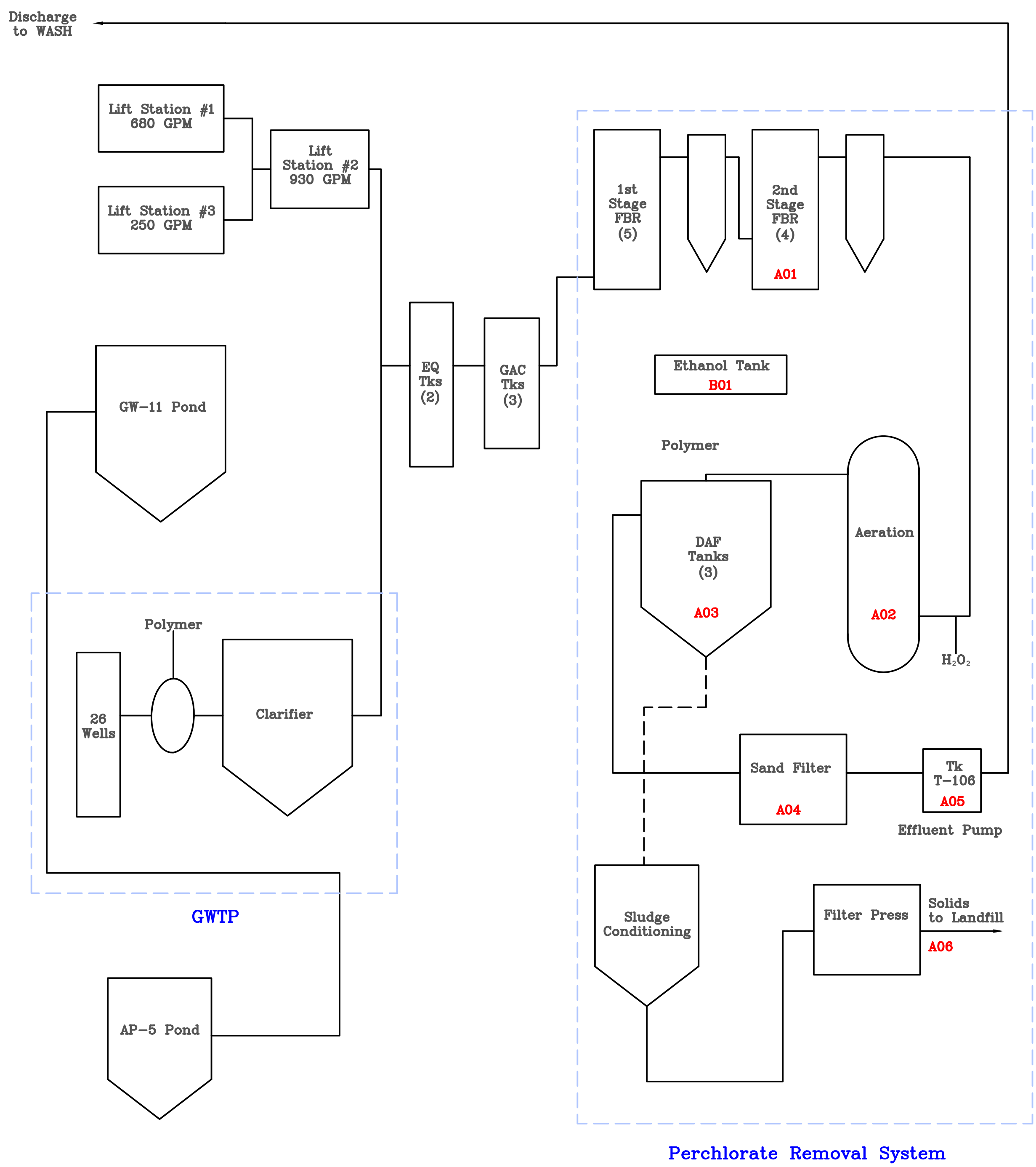
Responsible Official Certification Signature	Signature Date

To be filled out by Applicant – Payment Information – (Please Print)	
Check Number:	**Name and Address (as it appears on check):**
Telephone #:	
Credit Card # (Last 4 Digits):	

SITE MAP

BROADBENT	Veolia Water North America 510 South Fourth Street Henderson, NV 89015	Project Number: 12-01-201-201	Prepared By: S. Orlov Reviewed By: S. Cole Date: 10/25/2012	Drawing 1: Site Map with Building and Plant Locations

FLOW DIAGRAM



BROADBENT

Drawn By: SO Approved By: SC Date: 10/25/12

Flow Diagram
Veolia Water North America
510 South Fourth Street
Henderson, Nevada

Project No. 12-01-201-201

Drawing
2

SOURCE POTENTIAL TO EMIT

Nevada Environmental Resposne Trust
Facility-Wide Potential to Emit (PTE)

Pollutant	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**CO**	**SO_X**	**VOC**	**Lead**	**H_2S**
Perchlorate Removal System (tons/year)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.78
Ethanol Storage Tank Emissions (tons/year)	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00
Potential to Emit (tons/year)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.25**	**0.00**	**3.78**

EMISSION UNITS LIST

Nevada Environmental Response Trust
List of Emission Units (EUs)

EU	Description	SCC	Rating or Capacity	Make	Model	Serial No.
A01	2nd Stage Fluid Bed Reactors (FBRs 5-8)	50410764	28,800 gal each	~	~	~
A02	Aeration Tank T-401	50410764	28,000 gal	~	~	~
A03	Dissolved Air Flotation Tanks (D-501/551)	50410764	1000 gpm	~	~	~
A04	Effluent Pump Tank T-601	50410764	15,200 gal	~	~	~
A05	Sand Filter	50410764	~	Parkson	Dynasand	~
A06	Solids Handling	50410764	1000 gpm	~	~	~
B01	Ethanol Storage Tank T-703	2510000165	20,000 gal	~	~	~

Nevada Environmental Response Trust
Report Addressing Areas of Potential Air Emissions
And Emission Unit Determination

As requested in the communication from the Clark County Department of Air Quality (Air Quality) dated September 12, 2012, Veolia Water North America (Veolia) has prepared the following document, which provides a description for each component of the onsite treatment process. In addition, an emissions units list and potential to emit (PTE) calculations have been provided as attachments to this document.

1. Lift Stations

There are three hydraulic lift stations which convey water from collection well fields to the Equalization Area. Lift Station 1 receives water from 10 collection wells located near the Las Vegas wash at a rate of approximately 600 gallons per minute. The water from each of the collection wells is pumped into an underground holding tank and is then pumped from Lift Station 1 via a vertical turbine pump through a 6-inch pipeline to Lift Station 2, located near the intersection of Galleria Road and Pabco Road in Henderson. Lift Station 3 receives water from 7 collection wells located near the intersection of Galleria Road and Moser Drive in Henderson at a rate of approximately 300 gallons per minute. Ferrous sulfate is added to the water to treat low concentrations of hexavalent chromium. The water from the collection wells is pumped into an underground holding tank, and then pumped to Lift Station 2 via submersible pump through a 6-inch pipeline. Water from Lift Station 1 and Lift Station 3 combine in an underground storage tank at Lift Station 2. The water at Lift Station 2 is then pumped via vertical turbine pump to the Equalization Area through a 10inch pipeline.

The lift stations, and all associated equipment, contain no venting mechanisms to the atmosphere. Because this is a closed system, there are no air emission sources related to any of the lift stations.

2. Equalization Basin

The equalization basin (EQ) area receives influent flow comprising treated effluent from the ferrous sulfate treatment system (referred to as the GWTP), and groundwater from Lift Station 2.

Feed Tank (TK-101A) is interconnected to Feed Tank (TK-101B), so that they act as a single tank. Raw Water is pumped from the Feed Tank by the Raw Water Feed Pumps (P-102A, B) to the Granulated Activated Carbon (GAC) Adsorbers (GC-201A, B, C) and eventually on to the Fluidized Bed Reactor (FBR) System.

The GAC adsorbers do not vent to the atmosphere and therefore are not a source of air emissions. The carbon is changed out on a five year schedule due to the low concentrations of VOCs anticipated from influent groundwater, which indicates that influent VOC concentrations are very low.

3. Fluidized Bed Reactors

Water from the EQ area feeds to each operating first stage Fluidized Bed Reactor (FBR) vessel (there are five front stage and 4 back stage reactors) combined with recycle flow, ethanol solution, nutrient solution, phosphoric acid solution, and pH control solution (25% caustic). The FBR vessels contain integral fluidization distribution and effluent collection systems. These internal components are designed to enhance uniform flow distribution.

Perchlorate is converted through microbial metabolism to chloride ion in the presence of an electon donor (ethanol). Sulfates present in groundwater are also converted in this process to hydrogen sulfide.

The FBRs are open top tanks and off gas directly to the atmosphere. The FBRs are a potential hydrogen sulfide (H_2S) emission source. Table 1 lists the potential sources along with their maximum uncontrolled and controlled air emissions. Please refer to the attached Calculation Support Document for further details.

4. Aeration Tank

The biological treatment of perchlorate in the groundwater incidentally removes the dissolved oxygen from the water. To restore dissolved oxygen, the treated water enters an aeration tank (T-401). A blower pushes air through diffusers in the bottom of the aeration tank, which dissolves oxygen into the treated water. The air stream is passed though abiofilter (described below) which is designed to removed odorous compounds prior to discharge to the atmosphere. It is important to note that dissolved sulfide concentrations are reduced prior to the aerator through the addition of hydrogen peroxide which would tend to minimize the presence of hydrogen sulfide. Emissions from the Aeration Tank are discharged directly to the Biofilter (see next section)

5. Biofilter System

The H-120 Biofilter system utilizes Shaw Environmental and Infrastructure's Bio-filter Media to remove odorous compounds and other constituents (i.e., reduced sulfur compounds and hydrocarbons, respectively) from the aeration tank headspace. Air enters the Biofilter through the chamber below the media. Its velocity decreases as it enters the large media chamber, and it slowly flows upward through the Biofilter media. While passing through the media, the contaminants in the air stream are metabolized and removed. The purified air passes through the upper chamber of the Biofilter and out via a vent flange.

The Aeration Tank is a potential H_2S emission source, and the Biofilter acts as a control device. Table 1 lists the potential sources along with their maximum uncontrolled and controlled air emissions. A 95% control efficiency for H2S has been applied to aeration tank emissions to account for Biofilter capture.

6. Dissolved Air Flotation (DAF)

Following the FBR and aeration process, the wastewater is coagulated with ferric chloride, passed through a static mixer, flocculated with a cationic polymer, and then processed through the Dissolved Air Flotation (DAF) Separators which separates biomass from the wastewater stream.

The system uses one of the two Dissolved Air Flotation Separators (DAF-501 and DAF-551) to clarify the wastewater stream exiting the aeration tank. The chemically conditioned wastewater is combined with a recycle stream of clarified DAF effluent that has been saturated with air in the pressurization system. The super-saturated effluent passes through a pressure reduction valve just before entry into the DAF. As pressure is reduced, the air is released from the water as fine bubbles. The air/water mixture is introduced into the flotation chamber through a perforated pipe header and is combined with the influent flow. The rising air bubbles float the biomass particles to the surface where they can be removed with the surface skimmer.

The DAF units are a potential H_2S emission source, although the presence of dissolved sulfides is minimal post oxidation and aeration. Emissions have been conservatively estimated using influent aeration tank dissolved sulfide concentrations. Table 1 lists the potential sources along with their maximum uncontrolled and controlled air emissions. Please refer to the calculation support document for further details.

7. Effluent Pump Skid

Treated water from the DAF gravity flows via a 10-inch pipe into the DAF effluent tank (T-601) an open top tank, where caustic is added for pH adjustment. The DAF effluent pumps (P-601 or P-602) convey water from T-601 to the sand filter for further solids removal and final effluent clarification.

The treated water has a neutral pH (6.5 to 7.5) and most of the microorganisms have been removed. T-601 is a potential air emission source, although the presence of dissolved sulfides is minimal post oxidation and aeration. Emissions have been conservatively estimated using influent aeration tank dissolved sulfide concentrations. Table 1 lists the potential sources along with their maximum uncontrolled and controlled air emissions. Please refer to the calculation support document for further details.

8. Sand Filter

Treated water from T-601 is pumped through the Parkson sand filter for further solids removal and final clarification before traveling to the final effluent tank (T-621) for final discharge via the effluent booster pumps.

As with the DAF tanks and Tank T-601, dissolved sulfide concentrations are minimal. However, emissions have been conservatively estimated using the aeration tank influent sulfide concentration.

9. Ultraviolet System

A UV system was originally installed and used for germicidal disinfection of plant effluent. Due to operational problems, this system was removed from service in 2006.

10. Effluent Booster Pumps

Treated water from the sand filter gravity flows through the UV system (inoperable) to final effluent storage tank T-621. T-621 feeds the Effluent Booster Pumps (P-1302a or P-1302b) which pump the final treated effluent water from the treatment system approximately 4.5 miles to final discharge at the Las Vegas Wash.

The Effluent Booster Pumps are not vented to the atmosphere. Consequently, there are no air emissions associated with this equipment.

11. Solids Handling Facilities

Sludge collected from the DAF system is pumped to a storage tank T-1601 before a polymer is added in a mixing tank T-901 to be conditioned for dewatering. From T-901 the conditioned sludge is pumped through an air diaphragm pump to a plate and frame filter press for dewatering. The filtrate water discharged from the filter presses is collected in tank T-903 before being pumped back into the DAF system. The dewatered sludge is cleaned from the filter press and dumped into a roll-off bin before being hauled by truck to the APEX landfill.

The dewatered sludge (in the roll-off) and water collected in T-903 are a potential source for H_2S emissions. Table 1 lists the potential sources along with their maximum uncontrolled and controlled air emissions.

GWTP Sludge

Sludge collected from the GWTP process is stored in tank T-1 where hydrated lime is added to aid in dewatering and to bind the trivalent chromium to prevent leaching. The sludge is pumped by diaphragm pump through a plate and frame filter press for dewatering. The dewatered sludge is collected in a roll-off bin before being hauled by truck to the APEX landfill.

The sludge and filtrate water from the GWTP process is generated from chemical percipitation rather than a biological process. There are no air emissions associated with GWTP process (see item 13).

12. Plant Air Compressors and Oxygen Generators

Compressed air for the plant is supplied by two Ingersoll Rand air compressors, (P-801 & P-802) that are located in the filter press building (D-1). The system has a 660-gallon air receiver tank (T-801), and an Instrument Air Dryer (T-802), two Oil Removal Filters (F-802 & F-803) and one Particulate Filter (F-804). One compressor will be on line while the other compressor will be in Auto\Start mode. While the unit is on line, the compressor motor will run continuously and the compressor will automatically load and unload as required to maintain 80 psig (+ or – 5 psi) air pressure in the air receiver tank. If the compressor that is on line does not maintain the 80 psig, the other compressor will automatically start and go on line.
Air from the two air compressors (P-801 & P-802) is fed through two 2 – inch CSTP40 carbon steel lines through a check and ball valve to the Compressed Air Receiver Tank (T-801). Air flow out of the tank is through a 1.5 – inch CSTP40 carbon steel line through a ball valve to the oil removal filter (F-802) through the Instrument Air Dryer (T- 802) to the particulate filter (F-804), out of the filter through a 1.5 – inch CSTP40 carbon steel line through a ball valve to a pressure control valve (PCV – 803) set at 100 PSI with a pressure indicator (PI-803).

The oxygen generator was originally installed and used to pump oxygen into the sludge storage tank (T-1601) to prevent the sludge from turning septic. It was found that the use of this oxygen generator created an explosive atmosphere and was removed from service.

Plant air compressors and oxygen generators run on grid power, not combustion sources. There are no air emissions associated with this equipment.

13. Groundwater Treatment Plant

The Groundwater Treatment Plant (GWTP) treats water collected from approximately 29 interceptor wells. The treatment system uses ferrous sulfate to chemically reduce hexavalent chromium to trivalent chromium. Treated water is discharged to a clarifier where a polymer is added to aid in the the settling of the chromium-containing solids.

Settled solids are collected from the clarifier tank in the sludge storage tank (T-1). The water is discharged from the clarifier into tank (TK-6).

From TK-6, the treated water from the GWTP can be sent to tank TK-7, tank TK-101A, or the GW-11 pond. The normal operating flow path is for the contents of TK-6 to gravity flow to TK-7.

The water in TK-7 is pumped out by the pond water auxillary pump (P-103) and sent to TK-101A at the EQ area, where it will eventually enter the FBR process for perchlorate treatment.

There is no hydrogen sulfide in this water. As such, there is no air emissions associated with the GWTP.

14. Chemical Feed Systems

Ethanol is used in the FBR system as a carbon source (food) for the microorganisms that degrade the contaminants in the influent feed water. The 20,000 gallon ethanol storage tank is a potential source of VOC emissions. Table 1 lists the potential sources along with their maximum uncontrolled and controlled air emissions.

Other than the ethanol storage tank described above, the remaining chemical storage at the facility comprises non-volatile constituents (phosphoric acid, urea, nutrient solution, caustic, ferric chloride, cationic and anionic polymers, ferrous sulfate, hydrogen peroxide, and defoaming solution). None of these constituents contain constituents that would represent a potential air emissions source for criteria pollutants.

15. Process Control Targets

Process control targets are identified as parameters used for operational control to ensure proper destruction of the contaminants in the waste stream (i.e. a pH range of 6.5 to 7.5 would be used as a process control target).

There is not any equipment associated with process control targets and therefore no air emissions.

PRODUCTION INFORMATION

INHERENT LIMITATIONS

AIR POLLUTION CONTROL EQUIPMENT

Production Information

The perchlorate treatment plant has a maximum operating capacity of 1.44 million gallons per day (MGD). It is requested that the ethanol storage tank have a maximum throughput of 150,000 gallons per year.

Inherent Limitations

Ethanol usage is based on plant flowrate and influent perchlorate concentration. Ethanol usage should not exceed 150,000 gallons per year with the plant operating at maximum capacity. As such, this can be considered an inherent production limitation rather than a voluntarily accepted emissions limitation (VAEL).

Air Pollution Control Equipment (APCE)

The plant operated a biofilter system, which removes hydrogen sulfide (H_2S) from the aeration tank headspace. The biofilter has been assigned a control efficiency of 95% for H_2S. Equipment specifications are provided below.

Biofilters T-402 A/B:	
Number:	2
Size:	6’ x 6’6”
Capacity:	120 ft^3
Blower:	200 cfm @ 5” WC

SOURCE-WIDE PTE CALCULATIONS

Facility-Wide
Uncontrolled Potential to Emit

EU	Description	Production Limit (MGD)	PM_{10}	$PM_{2.5}$	NO_X	CO	SO_X	VOC	Lead	H_2S
Perchlorate Removal System										
A01	2nd Stage Fluid Bed Reactors (FBRs 5-8)	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.76
A02	Aeration Tank T-401	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
A03	Dissolved Air Flotation Tanks (D-501/551)	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
A04	Effluent Pump Tank T-601	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
A05	Sand Filter	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
A06	Solids Handling	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
		Subtotals:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.80
Ethanol Storage Tank										
EU	**Description**	**Production Limit (gal/year)**	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**CO**	**SO_X**	**VOC**	**Lead**	**H_2S**
B01	Ethanol Storage Tank T-703	150,000	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00
		Subtotals:	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00
Uncontrolled Emissions (tons/year)			**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.25**	**0.00**	**3.80**

Facility-Wide
Potential Actual Emissions (Controlled)

EU	Description	Production Limit (MGD)	PM_{10}	$PM_{2.5}$	NO_X	CO	SO_X	VOC	Lead	H_2S
Perchlorate Removal System										
A01	2nd Stage Fluid Bed Reactors (FBRs 5-8)	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.76
A02	Aeration Tank T-401	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A03	Dissolved Air Flotation Tanks (D-501/551)	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
A04	Effluent Pump Tank T-601	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
A05	Sand Filter	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
A06	Solids Handling	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
		Subtotals:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.78
Ethanol Storage Tank										
EU	**Description**	**Production Limit (gal/year)**	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**CO**	**SO_X**	**VOC**	**Lead**	**H_2S**
B01	Ethanol Storage Tank T-703	150,000	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00
		Subtotals:	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00
Potential Actual Emissions (tons/year)			**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.25**	**0.00**	**3.78**

EMISSION UNIT PTE CALCULATIONS

Perchlorate Removal System Hydrogen Sulfide Emissions

EU	Description	H_2S Emission Rate (lb/hr)[A]	Control Factor (%)	Uncontrolled Emission Rate (tons/year)[B]	Controlled Emission Rate (tons/year)
A01	2nd Stage FBR Tanks	0.859	0%	3.76	3.76
A02	Aeration Tank	0.003	95%	0.01	0.00
A03	DAF Tanks	0.001	0%	0.01	0.01
A04	Effluent Pump Tank T-601	0.001	0%	0.01	0.01
A05	Sand Filter	0.001	0%	0.01	0.01
A06	Dewatering/Solids Handling	0.001	0%	0.01	0.01
TOTAL H_2S Emissions, TPY				**3.80**	**3.78**

[A]*Please refer to Hydrogen Sulfide Emissions Calculations for emission factor calculations.*

[B]*Controlled Emission Rate = Uncontrolled Emission Rate x (1 - Control Factor)*

Ethanol Storage Tank VOC Emissions

EU	Description	Working Losses (lb/year)[C]	Breathing Losses (lb/year)[C]	Total Losses (lb/year)[C]	VOC PTE (tons/year)
B01	Ethanol Storage Tank	148.88	355.8	504.68	0.25
TOTAL VOC Emissions, TPY					**0.25**

[C]*Source: TANKS Emissions Report*

VEOLIA WATER NORTH AMERICA
GROUNDWATER TREATMENT PLANT EMISSIONS

Prepared For:

Veolia Water North America
8000 West Lake Mead Parkway
Henderson, NV 89015

October 2012

Prepared By:

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12-01-201-101

Introduction

Veolia Water North America operates a groundwater treatment plant located in Henderson, Nevada. The primary purpose of the plant is to remove perchlorates and chlorates from groundwater and return treated water to the Las Vegas Wash.

The primary pollutant of concern associated with the water treatment plant is hydrogen sulfide (H_2S). In addition, the plant operates an ethanol storage tank, which is a source of volatile organic compound (VOC) emissions. The following document presents emissions calculations for H_2S and VOC.

Hydrogen Sulfide Emission Calculations

As part of the water treatment process, fluidized bed reactors (FBRs) are utilized to reduce perchlorate and chlorate to more innocuous chloride and oxygen. This is accomplished using perchlorate-reducing bacteria, which use ethanol for their carbon source and perchlorate and chlorate as their oxygen source. The plant influent also contains nitrate and sulfate. The redox potential for perchlorate is higher; therefore the bacteria preferentially reduce the perchlorate. However, the presence of excess ethanol allows the bacteria to also reduce nitrate and some of the sulfate. The reduction of sulfate results in sulfides and hydrogen sulfide.

$$\underset{\text{sulfate}}{SO_4^{2-}} + \underset{\text{organic substrate}}{COD} \rightarrow \underset{\text{sulfide}}{HS^-} + \underset{\text{carbon dioxide}}{CO_2}$$

Because perchlorate and chlorate reduction occurs first and not all perchlorate is reduced in the 1st stage FBRs, it is assumed that all sulfate reduction occurs in the 2nd stage FBRs and that there is no sulfide prior to this point in the process. Following the FBRs and prior to the aeration tank, hydrogen peroxide is added in order to oxidize sulfides and reduce odor. As such, sulfide concentrations throughout the remainder of the treatment process are minimal, and the FBRs can be considered the primary source of H_2S emissions. To be conservative, emissions have also been calculated for the aeration tank, the dissolved air flotation (DAF) tanks, and the dewatering process.

In order to estimate H_2S emissions from water treatment processes, measured sulfide concentrations were used to calculate the volatile fraction of H_2S. At the plant, sulfides, temperature, and pH are measured at the FBR effluent point, and sulfides are measured again at the aeration tank inlet. Calculations are based on the *Wastewater Collection System Odor Control Guidelines* provided by the City of San Marcos, Texas engineering department. These calculations are an estimate of potential emissions and are based on the assumption that equilibrium conditions are reached within the FBR tanks.

Operating Parameters	
Average Temperature:	24°C
Average pH:	6.7
Maximum Plant Flowrate:	1.44 MGD

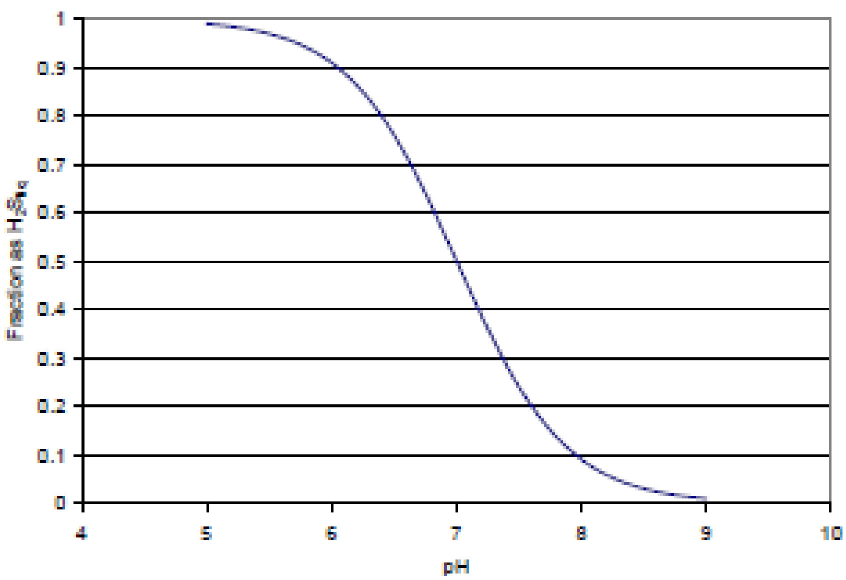
Step 1: Calculate Henry's Law constant based on temperature

$$H = 0.0084T + 0.2043$$

Where: H = Henry's Law constant for H_2S (unitless)
T = Wastewater temperature (°C)

Step 2: Use the Figure 1 below to estimate the FractionH_2S_{liq} based on pH

FIGURE 1
Fraction, based on pH, of incoming sulfide that is in the form of H_2S_{liq}



Calculate the equilibrium liquid H_2S concentration based on FractionH_2S_{liq} and the influent sulfide concentration, S_{out} (mg/L):

$$H_2S_{liq} = S_{out} \times FractionH_2S_{liq}$$

Where: FractionH_2S_{liq} = portion of dissolved sulfide as H_2S at equilibrium (mg/L)
S_{out} = influent sulfide concentration (mg/L)
H_2S_{liq} = incoming liquid H_2S concentration (mg/L)

Step 3: Calculate H_2S gas concentration

$$H_2S_{gas} = H \times H_2S_{liq}$$

Where: H_2S_{gas} = equilibrium hydrogen sulfide gas concentration (mg/L)

Please see Appendix A for detailed calculations.

Ethanol Storage Tank VOC Emissions

The source of emissions evaluated for the Veolia plant is the ethanol storage tank, which is a potential source of VOC emissions. The US EPA TANKS 4.0.9d emissions estimation program was used to calculate emissions for the tank. The following assumptions were made and used for the emissions model:

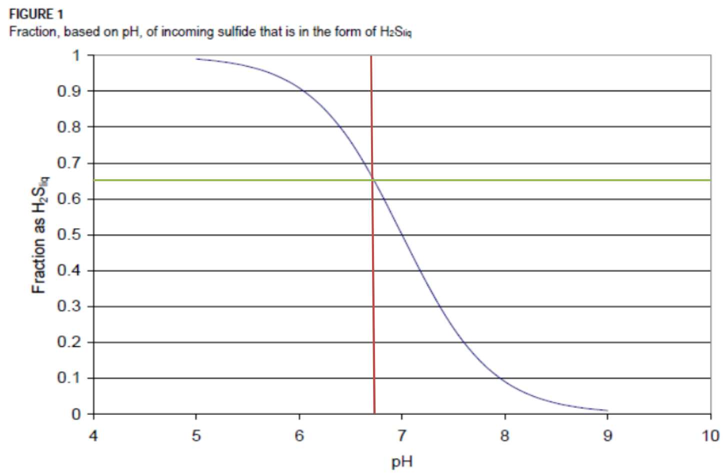
- Maximum annual ethanol throughput = 150,000 gallons
- The tank is white and in good condition
- The pressure/vacuum settings are approximately +0.01/-0.01 psig

Please see Appendix B for the TANKS Emissions Report.

Also, please note that VOC emissions have not been quantified for the plant as a whole because the front-end activated carbon treatment system is assumed to remove any VOCs present in the influent prior to the treatment train.

APPENDIX A: HYDROGEN SULFIDE EMISSIONS CALCULATIONS

Plant-Wide H2S
Potential to Emit Calculations
Veolia Water North America
Henderson Facility



Operating Parameters

Avg Temp (°C)	24
Avg pH	6.7
Henry's Constant (H)	0.4059
Fraction H_2S	0.65
Max Plant Flowrate (MGD)	1.44

Potential to Emit (PTE)

Emission Unit	Sulfides Conc. S_{out} (mg/L)	Liquid Fraction H_2S_{liq} (mg/L)	Gas Fraction H_2S_{gas} (mg/L)	H_2S Emission Rate (lb/hr)	H_2S Emission Rate (lbs/day)	H_2S Emission Rate (tons/year)
2nd Stage FBR Tanks	6.5	4.23	1.71	0.859	20.61	3.76
Aeration Tank	0.02	0.013	0.005	0.003	0.06	0.01
DAF Tanks	0.01	0.007	0.003	0.001	0.03	0.01
Effluent Pump Tank T-601	0.01	0.007	0.003	0.001	0.03	0.01
Sand Filter	0.01	0.007	0.003	0.001	0.03	0.01
Dewatering/Solids Handling	0.01	0.007	0.003	0.001	0.03	0.01
Total H_2S Emissions				**0.87**	**20.80**	**3.80**

Where:

H = Henry's Law Constant for H_2S (unitless)	*H = 0.0084T + 0.2043*
T = Water temperature (°C)	*measured*
S_{out} = Sulfide concentration (mg/L)	*measured*
Fraction H_2S = Fraction of sulfide in the form of H_2S based on pH	*interpolated (see Figure 1)*
H_2S_{liq} = Liquid H_2S concentration (mg/L)	$H_2S_{liq} = S_{out} * \text{Fraction } H_2S$
H_2S_{gas} = Equilibrium H_2S gas concentration (mg/L)	$H_2S_{gas} = H * H_2S_{liq}$
CE = Control efficiency	*95% for aeration biofilter*

Emission Rate Calculations:

*Emission Rate (lb/day) = [H_2S_{gas} (mg/L) * (1.45 MGD) * (3.785 L/gal) / (453,590 mg/lb)]*

*Emission Rate (tons/year) = Emission Rate (lb/day) * (365 days/year) / (2000 lbs/ton)*

APPENDIX B: TANKS 4.0.9d EMISSIONS REPORT

ETHANOL STORAGE TANK

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Veolia Ethanol Tank TK1
City:	Henderson
State:	Nevada
Company:	NERT
Type of Tank:	Horizontal Tank
Description:	20,000 gal ethanol storage tank

Tank Dimensions

Shell Length (ft):	38.67
Diameter (ft):	10.08
Volume (gallons):	20,000.00
Turnovers:	0.00
Net Throughput(gal/yr):	150,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.01
Pressure Settings (psig)	0.01

Meterological Data used in Emissions Calculations: Las Vegas, Nevada (Avg Atmospheric Pressure = 13.6 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Veolia Ethanol Tank TK1 - Horizontal Tank
Henderson, Nevada

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Ethyl alcohol	All	69.49	62.53	76.45	67.09	0.9049	0.7170	1.1341	46.0700			46.07	Option 2: A=8.321, B=1718.21, C=237.52

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Veolia Ethanol Tank TK1 - Horizontal Tank
Henderson, Nevada

Annual Emission Calcaulations

Standing Losses (lb):	355.7998
Vapor Space Volume (cu ft):	1,965.5562
Vapor Density (lb/cu ft):	0.0073
Vapor Space Expansion Factor:	0.0839
Vented Vapor Saturation Factor:	0.8053
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,965.5562
Tank Diameter (ft):	10.0800
Effective Diameter (ft):	22.2835
Vapor Space Outage (ft):	5.0400
Tank Shell Length (ft):	38.6700
Vapor Density	
Vapor Density (lb/cu ft):	0.0073
Vapor Molecular Weight (lb/lb-mole):	46.0700
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.9049
Daily Avg. Liquid Surface Temp. (deg. R):	529.1570
Daily Average Ambient Temp. (deg. F):	67.0708
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	526.7608
Tank Paint Solar Absorptance (Shell):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,790.7512
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0839
Daily Vapor Temperature Range (deg. R):	27.8380
Daily Vapor Pressure Range (psia):	0.4171
Breather Vent Press. Setting Range(psia):	0.0200
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.9049
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.7170
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	1.1341
Daily Avg. Liquid Surface Temp. (deg R):	529.1570
Daily Min. Liquid Surface Temp. (deg R):	522.1975
Daily Max. Liquid Surface Temp. (deg R):	536.1165
Daily Ambient Temp. Range (deg. R):	26.8250
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.8053
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.9049
Vapor Space Outage (ft):	5.0400
Working Losses (lb):	148.8810
Vapor Molecular Weight (lb/lb-mole):	46.0700
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.9049
Annual Net Throughput (gal/yr.):	150,000.0000

Annual Turnovers:	0.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	10.0800
Working Loss Product Factor:	1.0000
Total Losses (lb):	504.6809

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Veolia Ethanol Tank TK1 - Horizontal Tank
Henderson, Nevada

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Ethyl alcohol	148.88	355.80	504.68

FEDERAL PERFORMANCE STANDARDS

Federal Performance Standards

Hazardous Air Pollutant emissions generated by site remediation activities are subject to the following federal performance standards:

Title 40: Protection of Environment

PART 63—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES

Subpart GGGGG—National Emission Standards for Hazardous Air Pollutants: Site Remediation

However, the Veolia Water remediation system is not subject to 40 CFR 63 Subpart GGGGG for the following reasons:

- The facility is not a major source of HAPs as defined in §63.2; therefore the facility does not meet all conditions specified in §63.7881(a)(1) through (3).